

Remarks

Applicants respectfully request that the Examiner reconsider the present application in view of the foregoing amendments and the following remarks.

Claims 11, 20, 23, 24, 36, 38 and 53-67 are pending in the present application. Claims 11, 20, 23, 54, 64, 66 and 67 have been amended to further clarify and define the invention. Support for the common amendment to claims 11, 23, 54, 64, 66 and 67 can be found on page 11, line 15 to page 12, line 18 of the present specification. Applicants submit that one skilled in the art, upon reading the specification as originally filed, would understand and conclude that Applicants had implicitly or inherently contemplated the added limitation within the claims and that it was in Applicants' possession at the time of filing the application.

Entry of the above Amendment is thus respectfully requested.

Statement of the Substance of the Interview

Applicants' representative thanks the Examiner for the interview of October 26, 2010. Applicants' representative submits that the Substance of the Interview within the Interview Summary dated October 26, 2010 is accurate. Applicants also provide the following additional information.

For clarity in discussing the outstanding rejection in the Office Action, Applicants' representative provided the Examiner with Samples A-C, which are actual samples produced by the Applicants.

Sample A (Boswell method) is an example where metallic foil is hard embossed with a nickel shim. Sample B (Rich method) is an example of hard embossing an image into pre-printed metallic particle ink with a nickel shim. Sample C shows two examples, a conventional metallisation example where the holographic image has been fully vacuum metallised with aluminum and an example of the presently claimed invention, which the printed transferred

holographic image has been overprinted with the specially formulated vacuum metallised pigment (hereinafter "VMP") ink.

Applicants' representative requested that the Examiner keep Samples A-C for future examination of Applicants' Amendment.

With regard to the Examiner's question regarding samples A and B and their relative substrates, sample A (Boswell method) is a specially prepared stamping foil that is applied to a substrate and is hard embossed. The foil and image is embossed onto the surface of the substrate and lies on top of the substrate. Therefore, the substrate surface has a minor effect on image quality.

When the particle ink replaces the foil base in sample B (Rich method) and is printed onto the UV clear lacquer, this in effect partly seals the surface for the particle metallic ink. The substrate will affect the appearance of the image, however, Applicants submit that the above methods have similar outcomes.

The key to the difference is that both Boswell and Rich methods rely on a conventional hard embossing technology to get the image in to the receptive medium (foil or ink) and in the case of the Rich method, the ink does not react in the same way as the VMP ink of the presently claimed invention. The presently claimed invention is in fact the reverse of this, *i.e.*, the clear UV is printed, the image is then transferred into it and then the VMP ink is then printed over it. Because of the properties of the VMP ink, it follows exactly the micro structure grating contours.

As indicated by the Examiner in the Interview Summary, it was suggested that Applicants provide additional process advantages over the prior art in overcoming the rejection. Applicants provide such process advantages in the following comments.

Rejection under 35 U.S.C. § 103(a)

Claims 11, 20, 23, 24, 36, 38 and 53-67 stand rejected under 35 U.S.C. § 103(a) as unpatentable over D'Amato *et al.*, U.S. Patent No. 4,933,120, in view of Rich *et al.*, U.S. Patent No. 5,981,040 (hereinafter "Rich").

Applicants respectfully traverse the rejection.

The Examiner's Position:

The Examiner asserts that the present application is obvious in light of the above cited references, as indicated on pages 2-4 of the outstanding Office Action.

Based on the following, Applicants contend that the Examiner's position is not supportable, thereby making the presently claimed invention unobvious over the cited references.

Applicants' Position

The presently claimed invention is directed to a method for forming a holographic diffraction grating on a substrate comprising the steps of:

- a) applying a curable compound to at least a portion of the substrate;
- b) contacting at least a portion of the curable compound with diffraction grating forming means;
- c) curing the curable compound and
- d) depositing a vacuum deposited metal pigment ink on at least a portion of the cured compound, wherein the vacuum deposited metal pigment ink has a thickness when deposited on a substrate which permits a transmission of light therethrough.

As indicated in MPEP § 2143, the Examiner must resolve the factors described in *Graham v. John Deere*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), which provides the controlling framework for an obviousness analysis, before utilizing the rationales that were established in *KSR Int'l Co. v. Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007).

Differences between the Invention and the Cited References

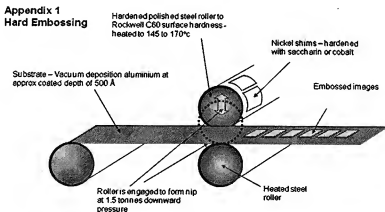
Applicants provide the following information regarding the *Graham* factor of ascertaining the differences between the prior art and the claims that are at issue.

To provide clarity and context, the following background information is provided.

In the art, all methods of producing a hologram have a common thread, that being a vehicle to impart a facsimile image into or onto the surface of a substrate. There are various embossing methods. Each method is described below.

Hard Embossing:

The most common method is “Hard” embossing, where an electrolytically formed nickel plate (shim) is used to impart a holographic image. The nickel shim is mounted on a steel roller and is pressed into the surface of the substrate coated with vacuum deposited aluminum using both heat and pressure. The steel roller holding the nickel shim is pressed against a similar highly polished back up roller (a mangle) resulting in a facsimile image being imparted into the substrate. See Appendix 1, below:



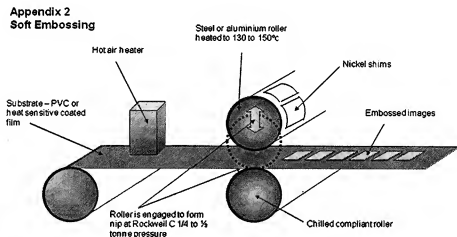
Since the very hard nickel shim is being impacted between two steel rollers, it degrades very quickly, which in turn reduces the image fidelity of the holographic image. Great care must

be taken to change the nickel shims on a regular basis at a point where degradation is about to occur.

Soft Embossing:

In contrast, soft embossing differs from hard embossing in that it does not rely on pure pressure to impart the holographic image. Soft embossing utilizes a nickel or plastic shim since the pressure required to impart the holographic image is fundamentally different from that of hard embossing.

In soft embossing, the holographic shim is held on rollers which can be of steel or aluminum because pressure is not the enabling factor. A chilled compliant backup roller is used, which is constructed of very hard plastic (which is normally a thin coating of between 6mm and 13mm thick at between 85 and 90 shore hardness). See Appendix 2, below:



The substrate (e.g., a polyvinylchloride film or heat sensitive coating on any other filmic substrate) is heated to its glass transition state, the point at which it reverts to a liquid.

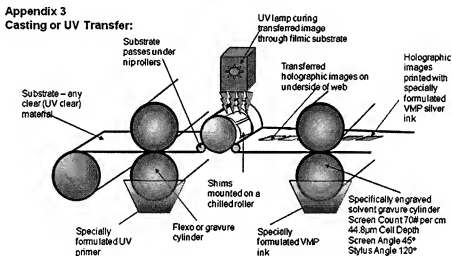
At this point the substrate enters the nip between the two rollers, the shim impacts the surface of the substrate and is immediately cooled by means of the compliant back up roller.

Upon contacting the chilled roller, the imparted image is formed. Applicants note that great care must be used to avoid post embossing deformation (similar to a cake that sinks after

being removed from an oven), which results in the holographic gratings being “rounded,” rather than having “sharp peaks.” Such results will affect the fidelity of the holographic image.

Casting or UV Transfer:

Applicants note that casting or UV transfer is **not** an embossing technique. Rather, this method is taught by D’Amato and is a printing method. See Appendix 3, below:



A nickel shim is mounted on a roller, and a UV coating is printed on the substrate surface. The shim makes contact with the wet UV and transfers the holographic image into the liquid and is instantly cured leaving a total facsimile of the holographic image within the surface of the UV. Applicants note that the shim only contacts the liquid UV, not the substrate. Therefore, there is low impact. The cured holographic image is then overprinted with a specially formulated vacuum deposited metal pigment ink (VMP).

Applicants submit that this is the only method of holographic duplication which retains the image in its entirety, unlike the previously mentioned methods where a percentage of the original hologram within the surface of the shim is lost.

D'Amato in view of Rich

Applicants submit that the method of “hard embossing” an image into a pre-printed metallic particle ink is a technique learned from the teachings of Boswell’s patent, U.S. Patent No. 5,464,690, as indicated in the Background section of the Rich reference and is exemplified by sample A (Boswell method) which was supplied to the Examiner during the interview.

Applicants submit that the presently claimed invention is fundamentally different to what is taught or suggested in the Rich reference.

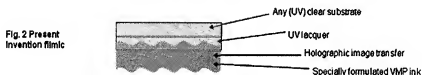
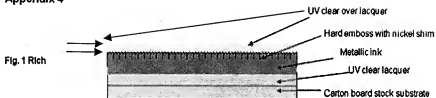
For the following reasons, Applicants contend that the presently claimed invention is not predictable and therefore unobvious to one of ordinary skill in the art.

Concerning the metallic ink disclosed in the Rich reference, this is a conventional ink and when printed on a substrate is “matt.” Only when the action of hard embossing is completed does it burnish.

What actually happens when the ‘matt’ ink is subjected to the action of hard embossing it has the reverse effect, *i.e.*, the surface image is not burnished. Quite the contrary, the thermal dynamics employed in hard embossing (*i.e.*, high heat and high pressure of the shim impacting the pre-printed metallic particle ink) the initially ‘matt’ finish is “burnt” thereby rendering the image less bright and not fit for the intended purpose. This is exemplified by sample B (Rich method) which was supplied to the Examiner during the interview. That is, a hard embossing of an image into pre-printed metallic particle ink with a nickel shim.

Applicants submit that based on Appendix 4, below, there is a distinct difference in the performance of the ink.

Appendix 4



The Differences discussed above can be summarized as follows:

Rich Method:

- Substrate – carton board stock
- UV clear lacquer
- Metallic ink
- Hard emboss with a nickel shim
- UV clear over lacquer

The Presently Claimed Invention

Any substrate paper or film
 UV lacquer
 Image transfer and UV cure
 Print with Specialist VMP

Applicants submit that the presently claimed invention is actually the reverse of the Rich reference. That is, the presently claimed invention does not involve heat or pressure and is a pure printing process, not an embossing process (see Appendix 1 and 3).

Applicants submit that the presently claimed invention is not predictable based on the prior art since the VMP ink Applicants use does not react in a predictable way.

For example, printing a conventional metallic ink over a cast/transferred image will result in the ink 'leafing' or lying across the top of the cast image which therefore blocks this image and does not follow the contours of the cast image below. This is exemplified in Appendix 5, below.

Appendix 5

Fig. 1 Rich Ink

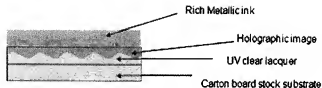


Fig. 2 VMP Ink



With regard to the ink discussed in the Rich reference, Applicants discussed during the interview of a work performed by the Applicants that indicates that the Rich ink is not combinable with the presently claimed invention.

Work was carried out by Boswell in conjunction with Rich to investigate if a credible hologram could be made by means of replacing the stamping foil with a pre-printed metallic particle ink (Rich method). Samples of printed ink were submitted to Boswell and an image transferred. The resulting image was dull and matt in appearance.

The pre-printed metallic particle ink was matt when printed onto a card substrate; and the fidelity of the image was further degraded due to the heat applied to the ink when being hard embossed with a nickel shim. The project was cancelled as a commercial application due to the above results.

Applicants contend that the step of applying a specifically formulated VMP ink in conjunction with specifically configured printing cylinders on the surface of the cast image is not obvious to someone skilled in the art and being the reverse of the Rich method.

Further, as pointed out in the interview, the presently claimed invention was based on sample substrate supplied by D'Amato to Boswell in order to verify the theory rejected by D'Amato as not being commercially viable for security documents.

During the Interview, it was suggested that if possible, Applicants provide additional process advantages over the prior art in overcoming the rejection. Applicants provide such process advantages in the following comments.

As discussed in the interview, the presently claimed invention is being used commercially on banknotes.

The present invention has a range of advantages over the conventional hard embossed technology. While "Hard" embossing technology has maximum speeds of 20 meters per minute, the presently claimed invention can be printed on conventional printing presses at conventional speeds up to 250 meters per minute.

The presently claimed invention allows complete ability to register with other print units. Therefore, print registration as opposed to embossing registration improves by a factor of 10.

There is no excessive heat or pressure that occurs with the presently claimed invention.

Since the presently claimed invention uses in-line processing with other print stations, there are no off-line processes involved.

Applicants note that the presently claimed invention allows the ability to apply holograms to products which were previously excluded due to cost.

Based on the above, Applicants submit that there are significant economic advantages over the conventional technology.

Obviousness has not been Established

Applicants submit that based on the differences discussed above, the Examiner has not resolved the *Graham* factor of ascertaining the differences between the prior art and the claims that are at issue, and therefore the rationale the Examiner provides for the rejection is improper.

"When an applicant submits evidence, whether in the specification as originally filed or in reply to a rejection, the examiner must reconsider the patentability of the claimed invention. The decision on patentability must be made based upon consideration of all the evidence, including the evidence submitted by the examiner and the evidence submitted by the applicant. A decision to make or maintain a rejection in the face of all the evidence must show that it was based on the totality of the evidence. Facts established by rebuttal evidence must be evaluated along with the facts on which the conclusion of obviousness was reached, not against the conclusion itself." In re Eli Lilly & Co., 902 F.2d 943, 14 USPQ2d 1741 (Fed. Cir. 1990). (See MPEP § 2142; emphasis added)

Applicants submit that the differences between the prior art references and the presently claimed invention are clear. Applicants note that although the above comments discuss the D'Amato and Rich references individually, this was only for discussing these references in terms of the *Graham* factor analysis. Applicants submit that taking the above *Graham* analysis in mind, the combination of D'Amato and Rich does not lead to the presently claimed invention.

Based on the above, Applicants submit that there is no teaching or motivation to combine the D'Amato and Rich references, as the Examiner asserts, and Applicants respectfully submit that impermissible hindsight reconstruction was used in support of the suggested combination of references relied upon by the Examiner. See MPEP § 2142.

In light of the above amended claims and remarks, Applicants submit that the assertions made by the Examiner regarding the D'Amato and Rich references are incorrect, thus failing to support the Examiner's position. Accordingly, based on the differences between the presently claimed invention and the D'Amato and Rich references, the cited references do not teach or suggest the presently claimed invention.

The secondary reference, Rich, fails to remedy the deficiencies of the D'Amato reference.

Since amended claims 11, 64 and 66 are not obvious to one of ordinary skill in the art, claims 20, 23, 24, 36, 38 and 53-63, 65 and 67, which ultimately depend from these claims, are unobvious over the D'Amato and Rich references for the same reasoning discussed above.

Applicants respectfully request reconsideration and withdrawal of the rejection.

Conclusion

Applicants respectfully submit that the rejection raised by the Examiner has been overcome, and that the present application now stands in condition for allowance.

Should there be any outstanding matters that need to be resolved, the Examiner is respectfully requested to contact Paul D. Pyla at the telephone number below, in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized to charge payment or credit any overpayment to Deposit Account No. 23-0975 for any additional fees required under 37 C.F.R. §§1.16 or 1.17.

Respectfully submitted,

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October 29, 2010